

Cast Arnokrome™ III

Product Information

Arnokrome™ III, developed by The Arnold Engineering Company, is a ductile permanent magnet alloy based on the iron-chromium-cobalt alloy system. Since the cobalt content is lower than in alternative magnetic alloys, Arnokrome may offer a significant advantage in replacement situations in terms of price stability.

The alloy has both good castability and ductility which permits the manufacture of a wide variety of product sizes and shapes. Arnokrome III may be sand cast into a variety of shapes, then machined and formed prior to magnetic heat treating. By adjusting the heat treatment, the alloy's magnetic properties can be tailored to specific permanent magnet requirements.

Arnokrome III is isotropic. By controlled heat treatment, coercive force is varied to specific levels between 50 and 300 oersteds to optimize the performance of the material for the customer's application. Arnold Engineering's applications personnel are available to provide technical assistance in the user's evaluation of Arnokrome. Arnokrome III can be supplied in most shapes available in Alnico products.

When choosing Arnokrome, the following factors should be considered:

- **Magnetic characteristics:** Arnokrome III is best suited for low coercivity applications. Br = 11,000 gauss Hc = 50 - 300 oersteds
- **Workability:** Arnokrome III is machinable by normal methods prior to magnetic heat treatment. After heat treatment, only grinding is recommended.
- **Cost:** Due to the nature of the heat treat cycle required to develop magnetic characteristics, the lower coercivities are less expensive. Higher coercivity requires a longer heat treat cycle.

Arnokrome™ III is an excellent substitute for Vicalloy, Cunife, and cobalt steels in many applications.

Contact your Arnold Sales Representative or call Arnold directly at 815-568-2000 for more information.

For information on Arnold's complete line of products, visit our website at www.grouparnold.com



Cast Arnokrome III is machinable with standard metal-working tools.

Chemistry

Chemical Element	Arnokrome III
Chromium	26 - 30%
Cobalt	7 - 10%
Iron	Balance

Physical Properties

Density	.277 lbs/cu in (7.6 g/cc)
Diameters Available	1.250" to 0.010"
Electrical Resistivity (25°C)	69 x 10 ⁻⁶ ohm-cm
Thermal Conductivity (100°C)	0.05 cal/sq cm/cm/sec/°C
Thermal Expansion (30° to 100°)	8.67 x 10 ⁻⁴ cm-cm ⁻¹ -°C ⁻¹
Temperature Range Coefficient	Mean Expansion (cm-cm ⁻¹ -°C ⁻¹)
30° to 400°C	10.4 x 10 ⁻⁶
30° to 300°C	10.2 x 10 ⁻⁶
30° to 200°C	9.84 x 10 ⁻⁶
30° to 100°C	8.67 x 10 ⁻⁶

Mechanical Properties

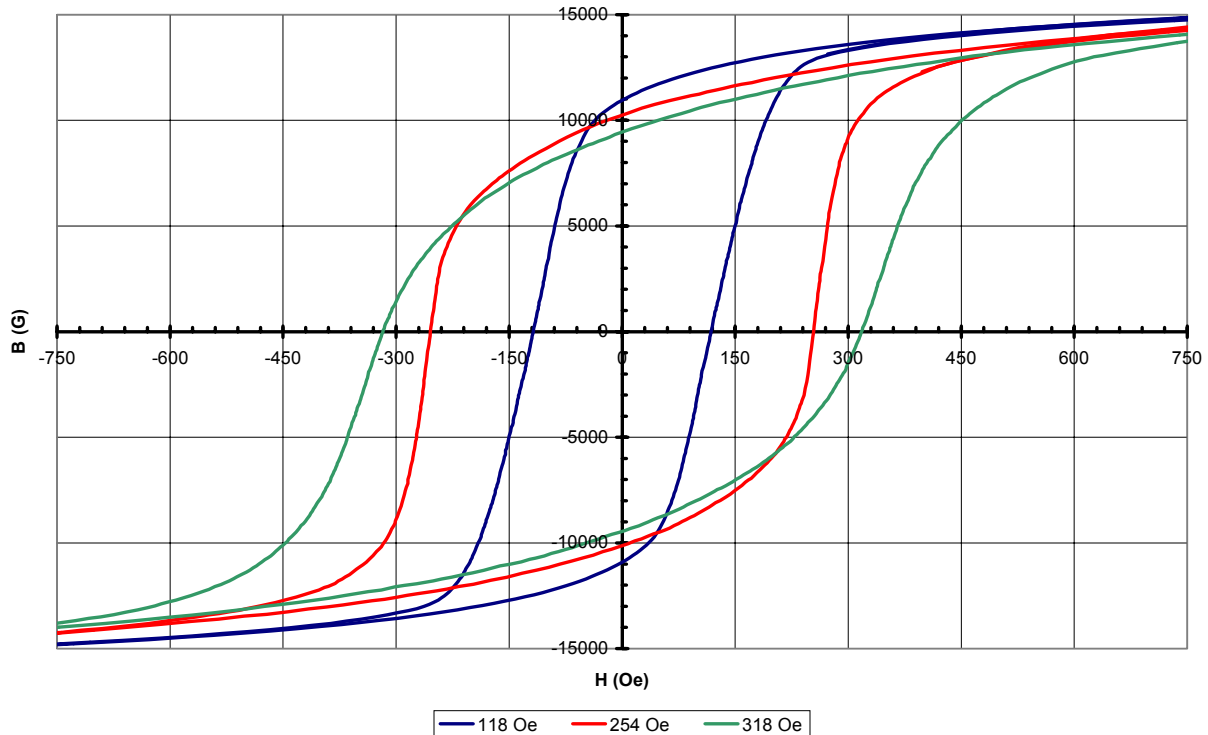
	Solution Heat (Treated condition)	Heat Treated (For desired Hc)
Tensile Strength	75,000 psi	120,000 psi
Yield Strength	50,000 psi	115,000 psi
% Elongation	25	6
Hardness	Rb 75	Rc 25

Magnetic Properties

Magnetic Remanence (gauss)	9,000 - 12,000 Br
Coercivity (Oersteds)	50 - 300 Hc
Energy Product (MGOe)	0.4 - 1.2
Reversible Temperature Coefficient of Magnetization	-0.02% /°C
Curie Temperature	625°C
Orientation	Isotropic

Cast Arnokrome™ III

Arnokrome 3 Hysteresis Loops



Hc, Oe:	118	254	318
Br, kG:	10.93	10.19	9.45
BHmax, MGOe:	0.535	1.22	1.17

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